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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/644,137	08/20/2003	Kevin K. Lehmann	PRU-103US	6484
23122	7590	11/15/2006	EXAMINER	
RATNERPRESTIA			SIEFKE, SAMUEL P	
P O BOX 980			ART UNIT	
VALLEY FORGE, PA 19482-0980			PAPER NUMBER	

1743
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DATE MAILED: 11/15/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b> 10/644,137	<b>Applicant(s)</b> LEHMANN ET AL.	
	<b>Examiner</b> Samuel P. Siefke	<b>Art Unit</b> 1743	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 30 August 2006.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-52 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-52 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |                                                                                                            |                                                                                         |
|------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                                           | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                       | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____                                                |

## **DETAILED ACTION**

### ***Response to Amendment***

The declarations (A and B) filed on 8/30/06 under 37 CFR 1.131 has been considered but is ineffective to overcome the Lerber reference. The earliest date of conception of an apparatus for use with a coherent source of radiation in order to measure a strain induced into a substrate is July 8, 2003 as shown by the submission of the Princeton University Office Technology Licensing and intellectual Property Confidential Invention Disclosure Form. The majority of the declaration with exception to the above is directed to the detection and measurement of trace species in sample gas and sample liquids as seen in US 2003/0109055.

### ***Claim Objections***

Claim 42 is objected to because of the following informalities: stain (sic) 4<sup>th</sup> line. Appropriate correction is required.

### ***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the

applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1-52 are rejected under 35 U.S.C. 102(e) as being anticipated by Lerber et al. (US 2002/0092977).

Lerber discloses a method and apparatus for measuring at least one physical parameter using an optical resonator. Light from a light source is fed into a resonator comprising a resonator and highly reflective couplers. Light coupled out of the resonator fiber is detected by a light sensor. The resonator is built such that its losses depend on a physical parameter to be measured. The light fed to the light source is switched on and off in step-like manner and the corresponding build-up or decay of the light detector signal is used to determine the time constant of the resonator and therefrom the physical parameter (abstract). A basic set-up of the invention is shown in FIG. 1. It comprises a light source 1, the output of which is coupled into a first feed fiber 2. From first fiber 2, it passes into a resonator fiber 3. Two couplers 4, 5 are arranged at the ends of resonator fiber 3. The light emitted from second coupler 5 is fed into a second feed fiber 6 and led to a light detector 7. The set-up further comprises a driver circuit 8 for driving the light source and a signal-processing unit 9 for processing the signal from light detector 7 (para 23 and 24). The bandwidth of the light source is not more than 7000 GHz, since this is the maximum bandwidth that can be handled by chirped grating reflectors. The light source is a laser or a narrow bandwidth LED, but it can also be a regular LED, in particular when no grating reflectors are used (para. 36). Resonator fiber 3 should be designed such that it has a strong outreaching evanescent

field. The fiber of FIG. 3 has a high index core 10 and a low index mantle 11 with circular or elliptic cross-section except for a flattened surface section 12 approaching core 10 (D shaped). Surface section 12 is used for receiving the substance, the absorption or scattering of which is to be measured. As this surface section is close to core 10, a strong evanescent optical field extends into the substance. An absorption or scattering measurement allows, for example, to determine the presence and concentration of a substance, in either quantitative or qualitative manner. While absorption is usually due to an intrinsic absorption of the substance, scattering can e.g. be caused by Raman, Brioullin or Rayleigh effects. One possible application is the monitoring of a chemical agent that changes its optical properties and in particular its absorption depending on the physical parameter to be measured. Such an agent can e.g. be a pH-sensitive or temperature sensitive chemical coated to surface section 12 of the fiber of FIG. 3. In the embodiment of FIG. 1, the resonator was operated in transmission. An alternative is shown in FIG. 6, where the resonator is operated in reflection. The light from feed fiber 2 is fed to a beam splitter 18, and from there through coupler 4 into a first end of resonator fiber 3. The second end of resonator fiber 3 is provided with a reflector 5' having a reflectivity of at least 90%. Light coming back through coupler 4 is led to beam splitter 18 and from there through feed fiber 6 to light detector 7. Reflector 5' is formed by a tapered end of resonator fiber 3, such as it is shown in FIG. 7. Such tapers behave as reflectors if the diameter of the waist or tip is smaller than the wavelength of the light. Tapers can provide total internal reflection, and they generate an outreaching evanescent near field at the tip. This field can be

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used for measuring purposes. Light source 1 can either be continuous or pulsed.

When using a pulsed light source with a pulse length much shorter than the roundtrip-time in the resonator, achieving high intensities within the resonator is difficult. The embodiment of FIG. 9 can either be operated in amplifier mode or in lasing mode. If used in amplifier mode, light from light source 1 is coupled through feed fiber 2 and coupler 4 into resonator fiber 3, where it is amplified by stimulated emission of light from the active medium. Optical fibers are thin, flexible and chemically inactive, which makes them suitable for any biomedical applications. Fiber optic sensors can be placed in the body, even at very delicate locations, like inside human arteries. The disclosed invention provides is the sensing with fiber tapers, such as they are shown in FIG. 7. If a taper is used as an end reflector, then an indicator agent coating with capability to change the refractive index or absorption according to the measured parameter can be used. E.g. in absence of some measured chemical or protein the refractive index of the reagent coating is such that the taper provides a total internal reflection and the losses of the cavity are low. Resonator fiber 3 (as well as feed fibers 2, 6) are preferably monomode fibers. However, multimode fibers, in particular graded index fibers, can be used as well. Figure 8 shows the resonator fiber in ring, see paragraph 57 for a complete teaching of the ring fiber embodiment. The entire specification of Lerber is pertinent in describing the instant application.

### ***Double Patenting***

The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the

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unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory obviousness-type double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent either is shown to be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement.

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

Claims 1-52 are provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1-47 of copending Application No. 10/157,400 in view of Lerber (US2002/0092977). Lerber teaches an optical ring resonator that detects chemical species in gases and liquid and also detects strain in the optical fiber. Therefore it would have been obvious to one of ordinary skill in the art to modify the copending application to include detection of strain in the optical fiber because it is shown in Lerber that an optical ring resonator detects strain induced into the optical fiber (paragraph 45)

This is a provisional obviousness-type double patenting rejection.

### ***Response to Arguments***

Applicant's arguments filed 8/30/06 have been fully considered but they are not persuasive. The prior art of De 19814575 has been withdrawn because it does not specifically teach detection of strain by an optical ring resonator device.

The Applicant argues, Lerber does not disclose or suggest "at least one sensor having a predetermined shape and in line with the fiber optic ring, the at least one sensor coupled to the substrate and responsive to the strain induced into the substrate...a processor coupled to the detector for determining a level of strain induced into the substrate based on a rate decay of the radiation in the passive fiber optic ring." The Examiner points to paragraph 45 where Lerber specifically states, "losses can also be affected by temperature changes, fiber strain, fiber tension, and or fiber deformation (bend, twist, deformation of cross-section). Therefore, such parameters can be measured by the present invention as well." Further Lerber specifically discloses a processor (signal processor unit 9) for determining the level of strain based on the rate of decay of the radiation in the passive fiber optic ring (paragraph 8, 23, 24,27,28).

Regarding the arguments directed to the ODP rejection, the Examiner has clarified the rejection and can be seen above.

### ***Conclusion***

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).



A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

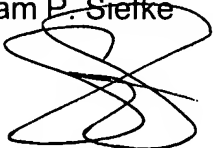
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Samuel P. Siefke whose telephone number is 571-272-1262. The examiner can normally be reached on M-F 7:00am-5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jill A. Warden can be reached on 571-272-1700. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.


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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Sam P. Siefke



November 8, 2006



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